

FROM BANNER 8 TO BANNER XE

What's the story?



I Spy an Ecosystem!



BANNER XE = EXTENSIBLE ECOSYSTEM

Banner powered by XE is the solution

ellucian
LIVE
2014

The Products

Web 2.0 user experience

Common look and feel across applications

Enhanced features

The Workforce

Accommodation of generational users

Improved usability

Better access to information

The Technology

Standards-based, open, and modern technology

Reduced upkeep of customizations

Evolutionary path from Banner 8.x

CHANGE FROM
BANNER 8 TO
BANNER XE

"THE SECRET OF
CHANGE IS TO FOCUS
ALL OF YOUR ENERGY,
NOT ON FIGHTING THE
OLD, BUT ON BUILDING
THE NEW."

— SOCRATES



Search

Personal Information

To read about your **FERPA (Family Educational Rights and Privacy Act)** rights and responsibilities, click here:
<http://www.registrar.illinois.edu/transcripts/ferpa.html>

Students: This message serves as your annual FERPA notification as required by law.

[Addresses & Phones](#)

[E-mail Addresses](#)

[Emergency Contacts](#)

[Name Change Information](#)

[Social Security Number Change Information](#)

RELEASE: 8.6

BANNER 8

Employee Dashboard



Bates, Ansal

View Profile

Vacation hours available as of 03-SEP-2014

54.58

Sick hours available as of 03-SEP-2014

12

Personal hours available as of 03-SEP-2014

23.54

Ed Leave hours available as of 03-SEP-2014

40

Birthday hours available as of 03-SEP-2014

16

Full Leave Balance Information

My Career

My Team

JOB SUMMARY

MYE001-00, VP for Academic Affairs

Job Information

PAY INFORMATION

Last Payment Paid on 2014-04-30

Direct Deposit Information

View All Pay Stubs

Download Latest Pay Stub

EARNINGS

Year to Date Earnings:
\$26,497.04

Earnings By Date Range
Earnings By Position

BENEFITS

View Current Summary
View Current Dependents

View Current Beneficiaries
Document Life Events

Open Enrollment

My Activities

Request Time Off

Enter Time

- Time Entry Approval
- Electronic Personnel Action Forms (EPAF)
- Faculty Load and Compensation
- Effort Reporting
- Labor Redistribution
- Pay Stub Administrator
- Salary Planner
- Benefits Administrator

BANNER XE

My Profile



Andersen, Thelma

ID: HOP510001

Status: Active

Hired: 2010-01-01

Birthday: 03/31

My Personal Information

Address			
Mailing 1074 Berkley Street Malvern Chester Pennsylvania 19355	School Campus 4481 Centennial Farm Road Malvern Chester Pennsylvania 19355	W2 Address 3391 Nuzum Court Malvern Chester Pennsylvania 19355	

Phone

Business or work
215 6336094

Email

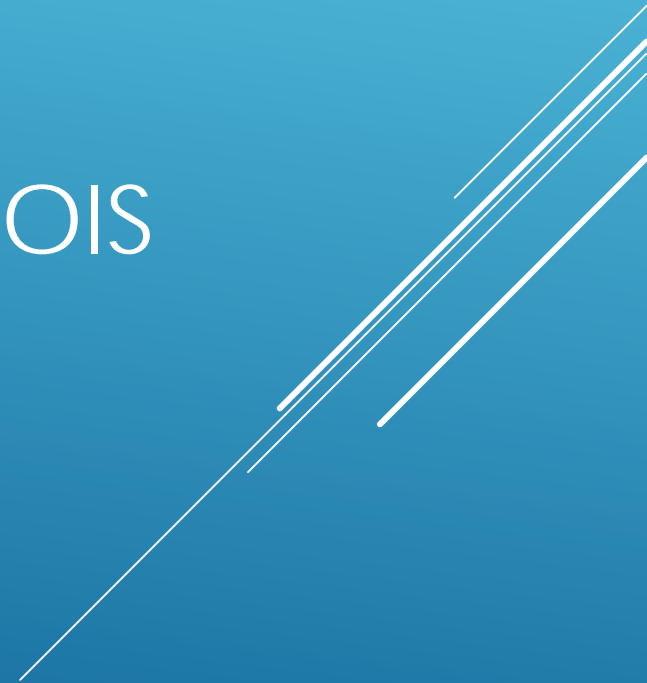
Campus E-Mail tbandersen@banner.edu	Home E-Mail tbandersen@googleled.com
---	--

Emergency Contacts

Spouse
Ronald Andersen
3391 Nuzum Court
Malvern
Pennsylvania 19355
215 6336094

BANNER XE

BANNER XE AT THE UNIVERSITY OF ILLINOIS



- ▶ Catalog and Schedule (2012)
- ▶ Faculty Grade Entry (September 2014)

CURRENTLY IN PRODUCTION





EXPECTATIONS VS. REALITY

- ▶ Advising Student Profile
- ▶ Events Management
- ▶ Student Registration
- ▶ Employee Profile
- ▶ Finance Self-Service Purchase Requisition

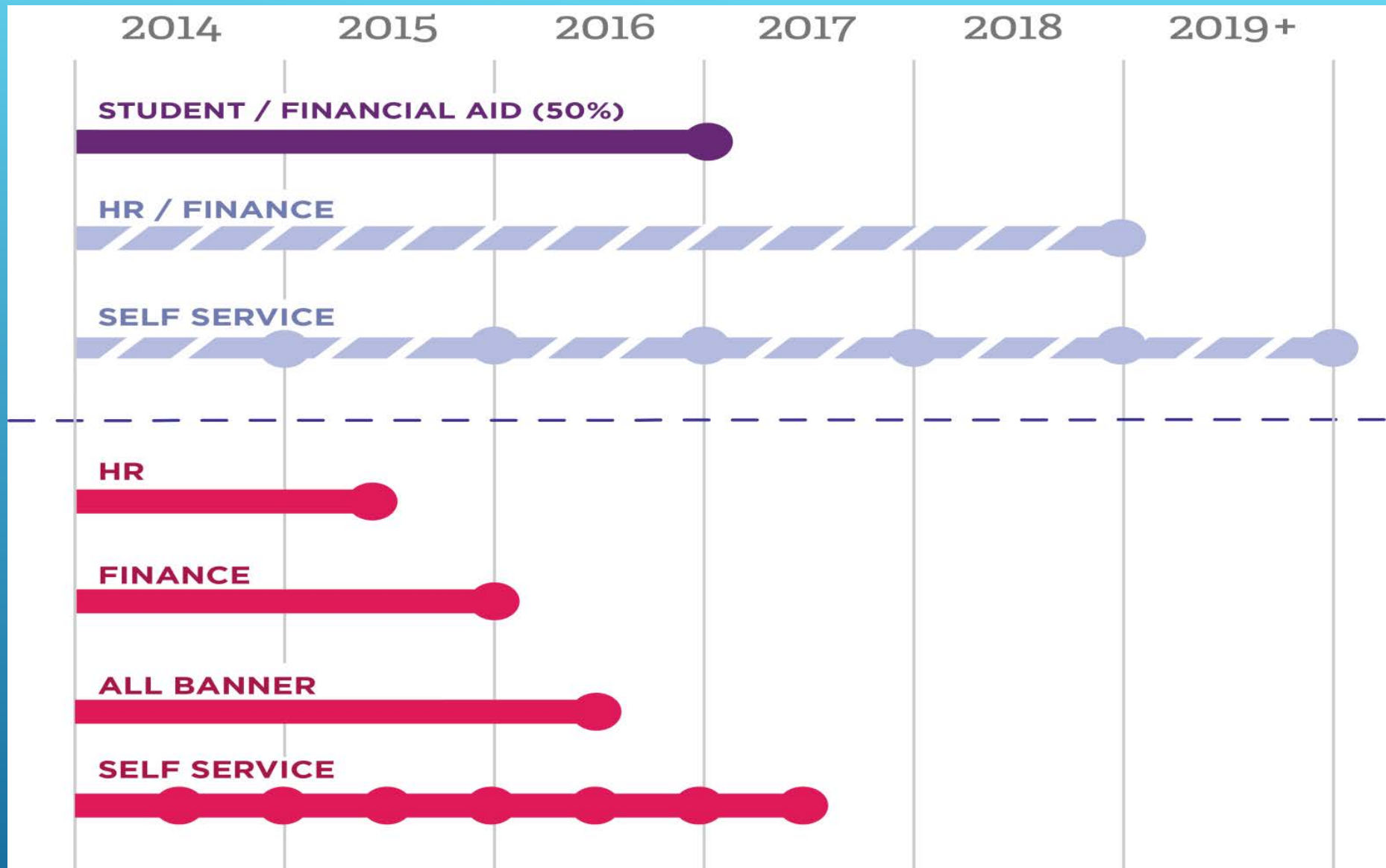
FUTURE XE MODULES

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, set against a blue background.

- ▶ Financial Aid
- ▶ Finance
- ▶ Human Resources
- ▶ Student



ACCELERATED XE DELIVERY



ACCELERATED DELIVERY

BANNER STUDENT

● Completed
 ● 80% Confidence Level
 ● 65% Confidence Level
 ● 50% Confidence Level

	2014		2015		2016		2017	
	Jan - Jun	Jul - Dec	Jan - Jun	Jul - Dec	Jan - Jun	Jul - Dec	Jan - Jun	Jul - Dec
FEATURES	Registration CR-2 Advising Student Profile	Registration 9.2 - GA Student Profile 9.1 Banner Communication Management CR-1	Academic History 9.1 GA Registration 9.3 Banner Communications Manager CR- 2 Course/Program of Study Student Support Student Profile - 9.2 Banner General Forms Transformation	Registration 9.4 Academic History 9.2 Banner Communication Management - GA Person/general information AR SS Manage Direct Deposit	Student Forms Transformation Online Enrollment Processing A/R Forms Transformation	Academic History 9.3 Fee Assessment AR SS View Fee Statement	AR Study Paths Contracts/Exemptions SS AR Pay Bill	Remaining Study Path functionality General Student SS CAPP SS Mobile Applied across student AR Academic Holds specific to study paths AR SS Payment Plans
		Common Navigation	Ellucian Solution Manager 1.4		Administrative Extensibility Self Service Extensibility			
QUALITY	CALBSTU Regulatory	USA Regulatory Brazil Regulatory	CALBSTU Regulatory	USA Regulatory Brazil Regulatory	CALBSTU Regulatory	USA Regulatory Brazil Regulatory	CALBSTU Regulatory	USA Regulatory Brazil Regulatory
	Australia Regulatory	Australia Regulatory	Australia Regulatory	Australia Regulatory	Australia Regulatory	Australia Regulatory	Australia Regulatory	Australia Regulatory
	UK Regulatory	UK Regulatory	UK Regulatory	UK Regulatory	UK Regulatory	UK Regulatory	UK Regulatory	UK Regulatory
	Canada Regulatory	Canada Regulatory	Canada Regulatory	Canada Regulatory	Canada Regulatory	Canada Regulatory	Canada Regulatory	Canada Regulatory
		Chile Regulatory		Chile Regulatory	Chile Regulatory	Chile Regulatory	Chile Regulatory	Chile Regulatory
		LAC Regulatory		LAC Regulatory	Chile Regulatory	LAC Regulatory	Chile Regulatory	LAC Regulatory
API	Student Profile Advising Course Catalog Schedule of Classes Faculty	Registration API API reference Table	Remainder Student Profile Grade Class Schedule Person	API Release	API Release	API Release	API Release	API Release

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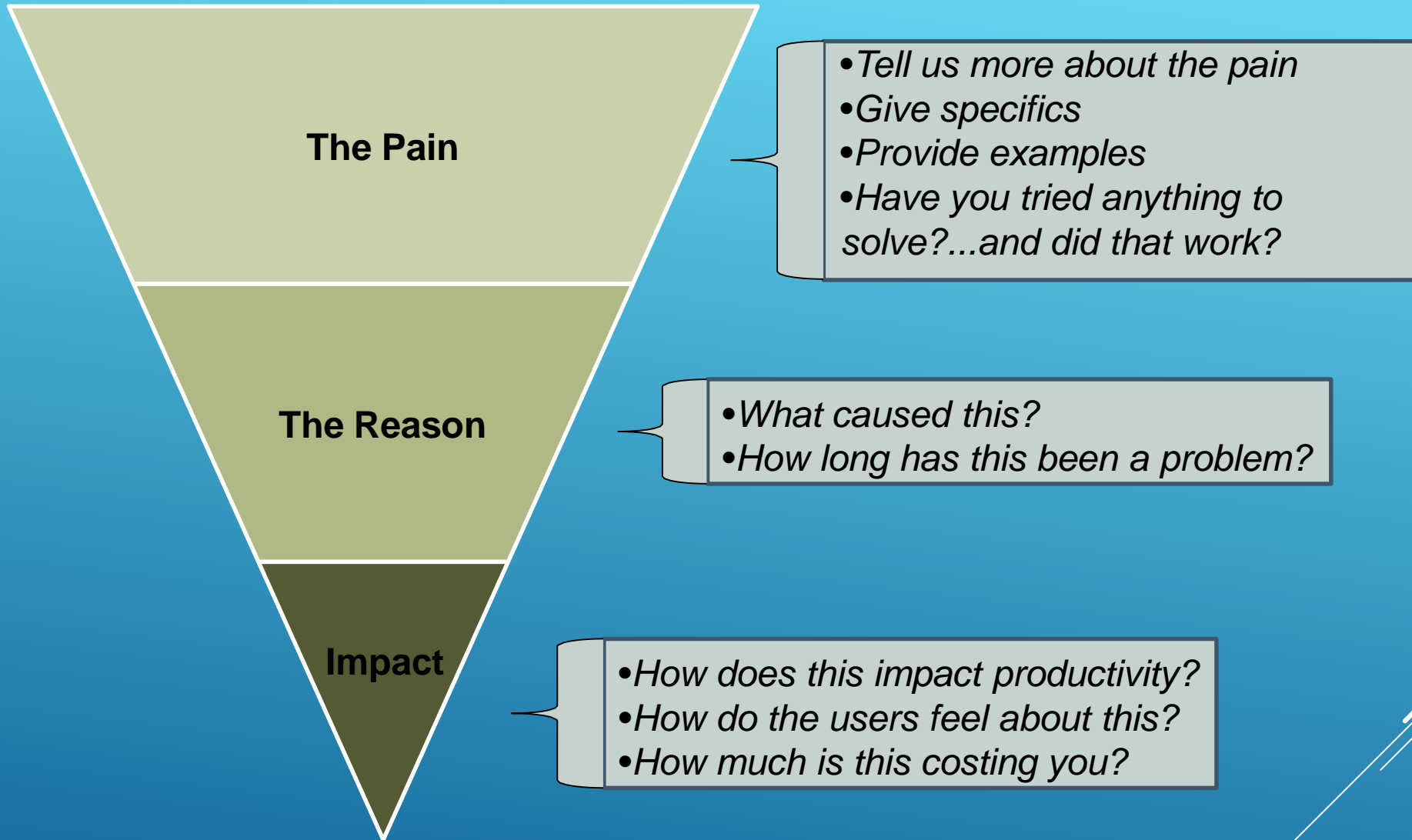


HOW ARE WE INVOLVED?

- ▶ Academic History
- ▶ Student Registration
- ▶ Employee Profile
- ▶ Finance Self-Service Purchase Requisition

DEVELOPMENT PARTNER GROUPS

Decorative white lines consisting of several parallel diagonal lines extending from the bottom right towards the top right of the slide.



The funnel gets us to user stories and user stories will help define the scope



ACCESSIBILITY

BANNER XE TECHNOLOGY

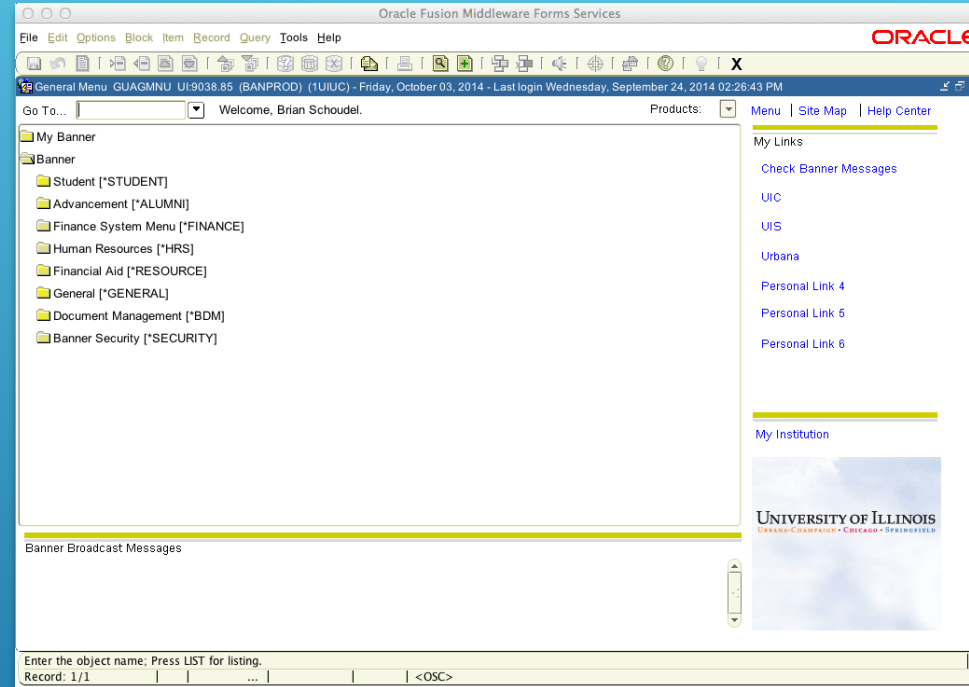
XE Architecture



dated

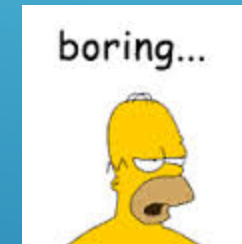
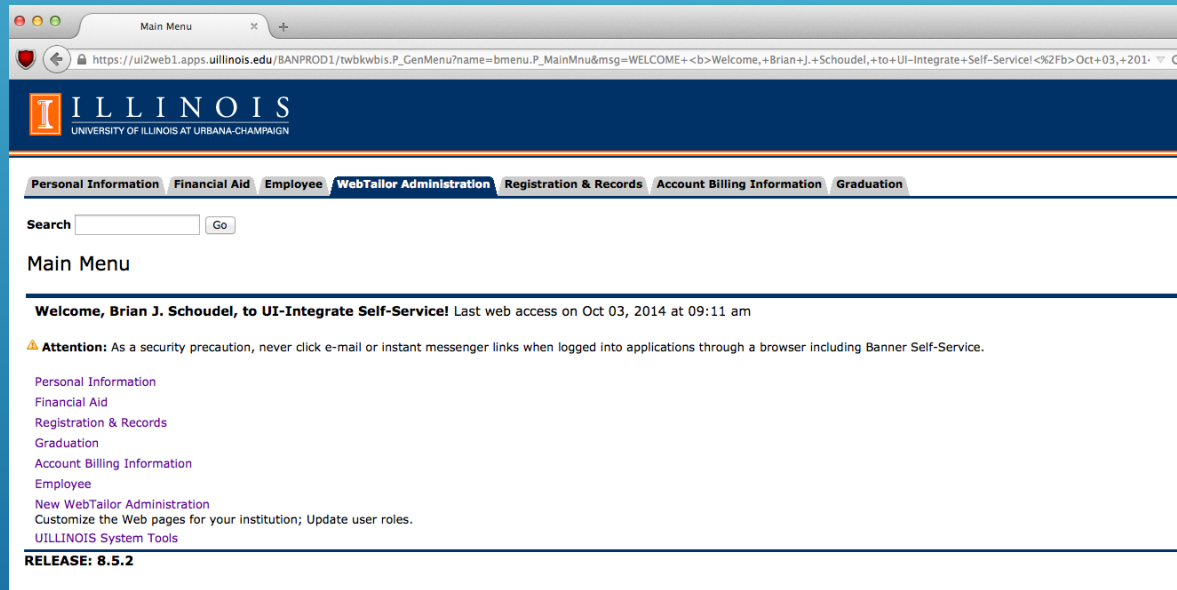


- ▶ Banner Administrative Forms (9-5 folks)
- ▶ Built on Oracle Forms technology
- ▶ Been around since 1985
- ▶ Client/Server arch converted to the web
15 yrs ago along with requiring the client side Java (ouch!!!)



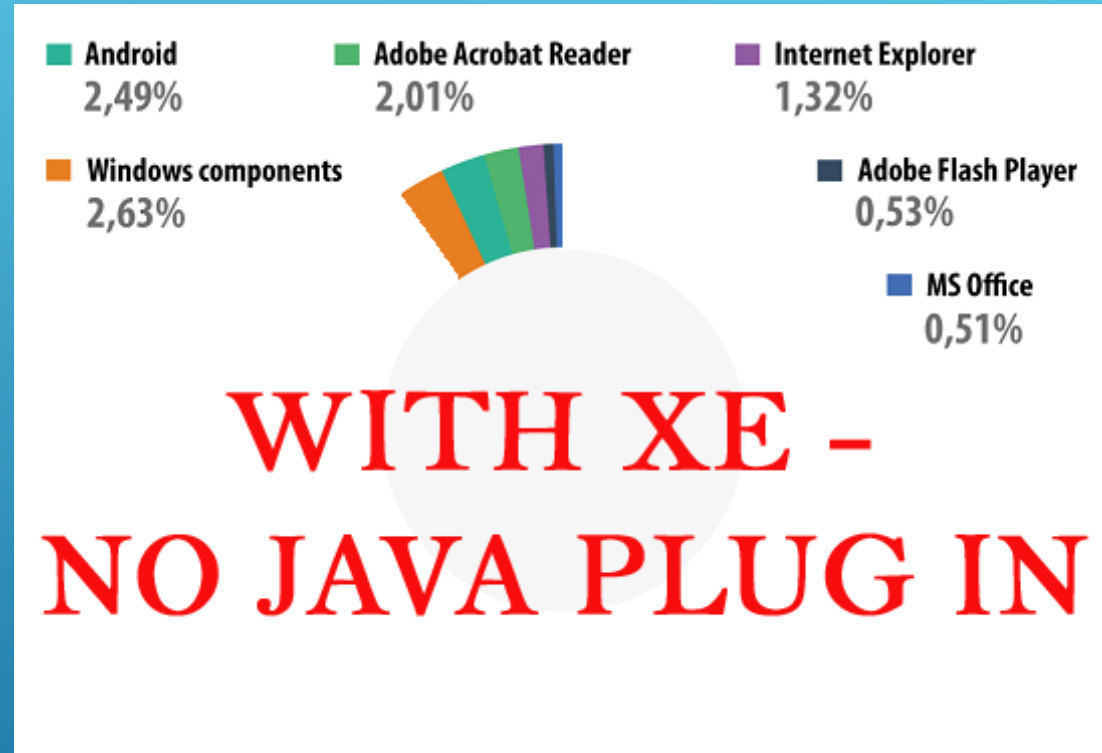
ORACLE LEGACY ARCHITECTURE

- ▶ Banner Self Service (registration, admissions, employee profile, etc...)
- ▶ Built on Oracle Web Toolkit (i.e. db packages converted to html and sent back to AS)
- ▶ Extremely efficient but user interface a little boring



ORACLE LEGACY ARCHITECTURE (CONT..)

- ▶ Per 2013 Kaspersky report*, 90.52% of all detected attempts to exploit vulnerabilities targeted Oracle Java.



*<http://securelist.com/analysis/kaspersky-security-bulletin/58265/kaspersky-security-bulletin-2013-overall-statistics-for-2013/#06>

ORACLE LEGACY ARCHITECTURE



- ▶ Written in **groovy** (yes groovy)
- ▶ Agile/dynamic language compiles down to java and deployed to a JVM
- ▶ Contains additional powerful features introduced in Python, Ruby and Smalltalk
- ▶ Much more efficient to code than Java

```
for (String it : new String[] {"Rod", "Carlos", "Chris"})  
    if (it.length() <= 4)  
        System.out.println(it);
```

Java

```
["Rod", "Carlos", "Chris"].findAll{it.size() <= 4}.each{println it}
```

Groovy

BANNER XE ARCHITECTURE

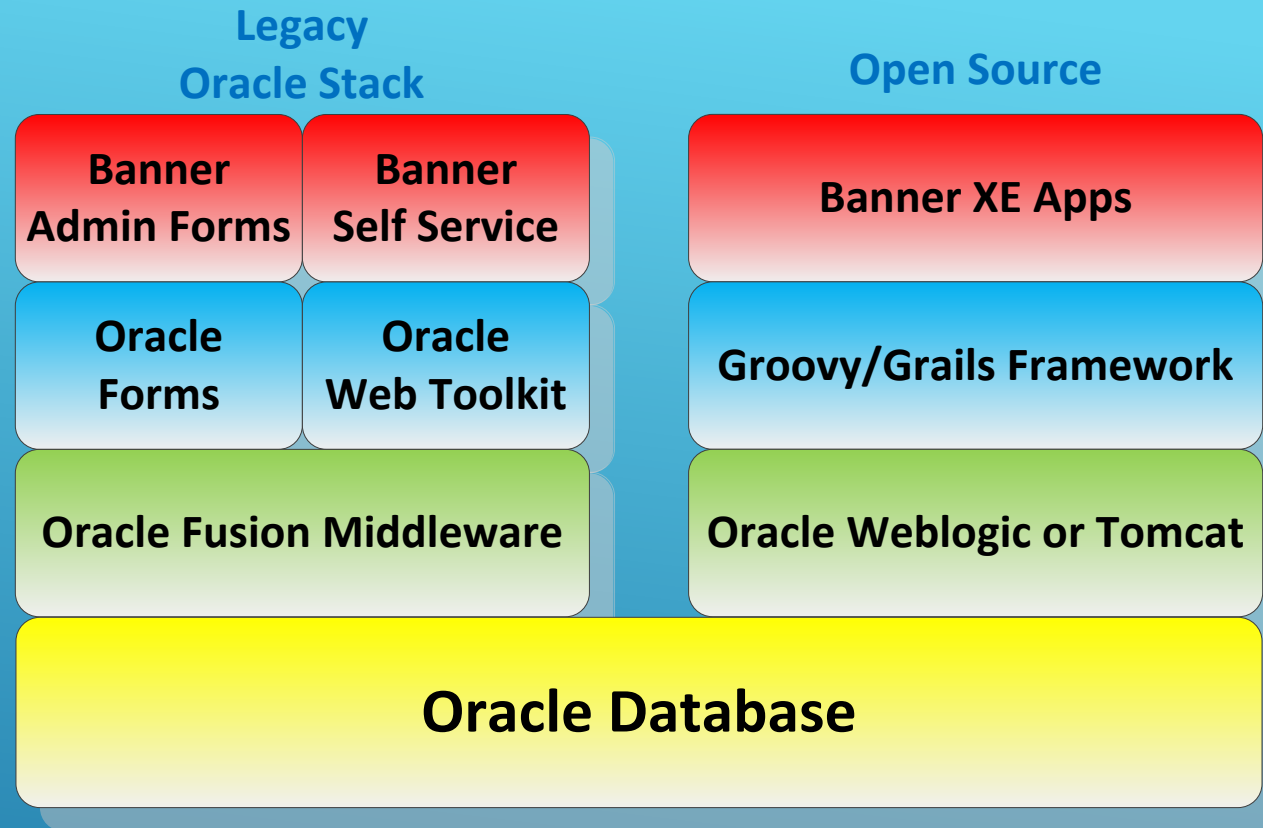
- ▶ **Grails** – open source java web framework (grails.org)
- ▶ Designed for high productivity – convention over configuration (no xml config files)
- ▶ Uses the groovy language
- ▶ Incorporates existing java technologies like Hibernate and Spring



BANNER XE ARCHITECTURE

- ▶ XE uses common web 2.0 user experience
- ▶ Uses standards based, open source, modern technologies
- ▶ Will coexist alongside Banner 8 during the transition
- ▶ Modularized to eliminate larger system dependencies and be more plug and play

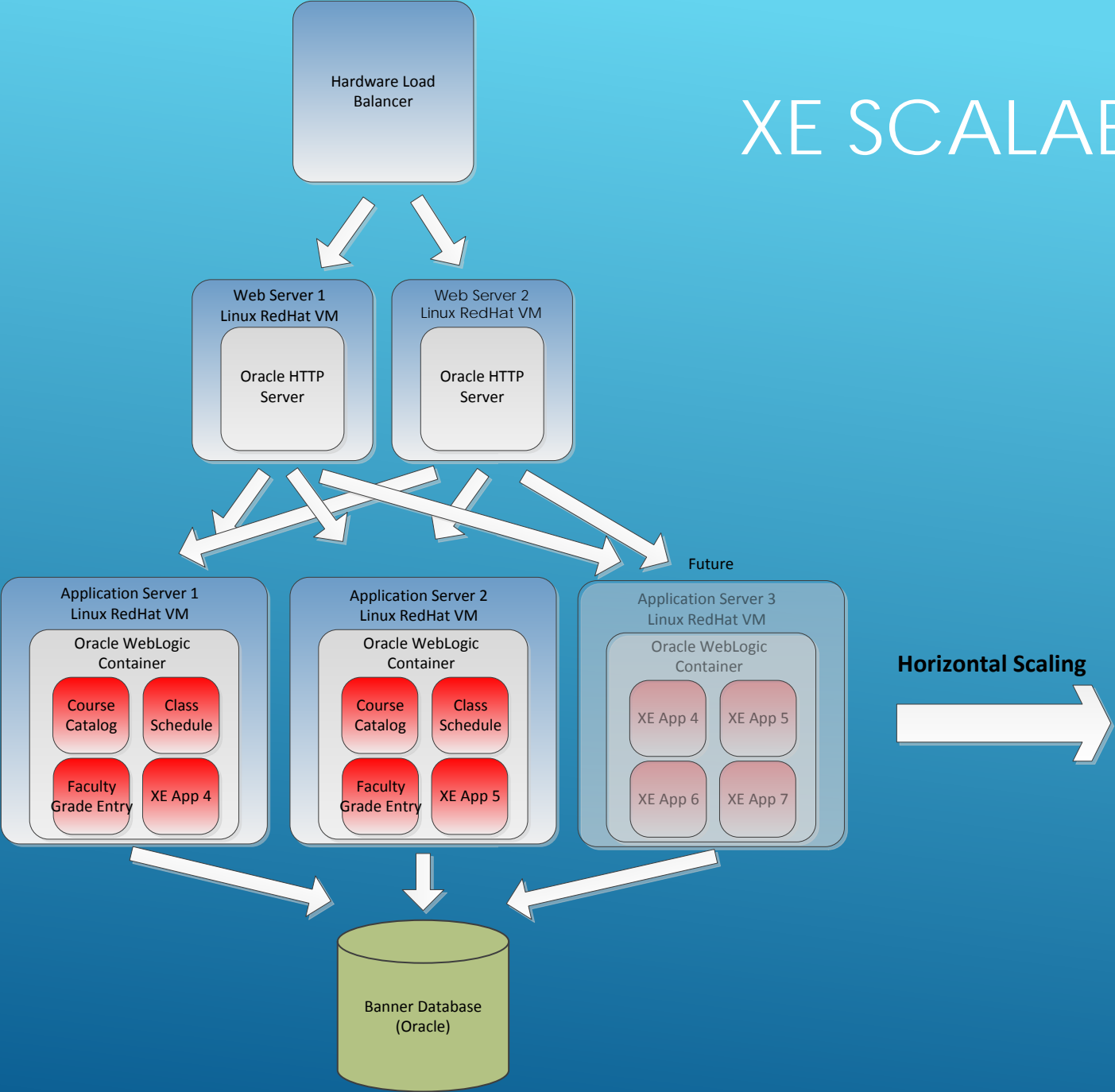
BANNER XE ARCHITECTURE



Oracle Database stays the same from Banner 8 to Banner XE

BANNER 8 VS BANNER XE ARCH

XE SCALABILITY



- ▶ Banner 8 Skills

- ▶ Banner Forms – IDE Forms Developer Suite/PLSQL
- ▶ Banner Self Service – PLSQL, HTML, CSS, JavaScript

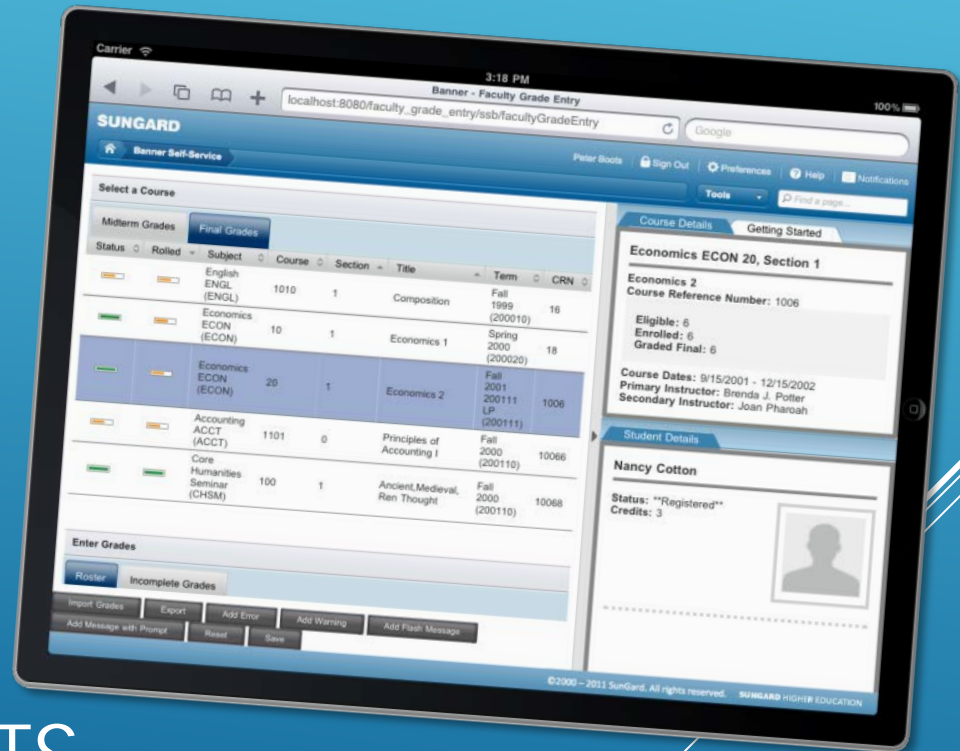
- ▶ Banner XE Skills

- ▶ Groovy/Java/Grails framework/JEE Framework
- ▶ HTML5, CSS, JavaScript, PLSQL
- ▶ IDE IntelliJ w/ grails plugin (could also use eclipse or good old fashioned text editor)
- ▶ Git version control



BANNER XE TOOLS OF THE TRADE

- ▶ All major browsers – Chrome, Internet Explorer 9, 10, and 11 (Windows 7), Safari 5.x, Firefox
- ▶ Chrome compatibility mode disabled
- ▶ IE compatibility view disabled
- ▶ NO Java Plug-In needed (makes security guys happy) or other client software
- ▶ Tablet support – Ipad iOS 7.x+, Ipad Mini, Android OS 4.x, Microsoft Surface 1.0, RT and PRO



END USER REQUIREMENTS

- ▶ XE currently supported out of the box with CAS (JASIG)
- ▶ We use EAS (.. Future SiteMinder)
- ▶ All XE products WILL support common industry standards (i.e. SAML2)
- ▶ Institutions will be free to choose ID management solution of their choice (i.e. SiteMinder)
- ▶ Ellucian will test with industry common commercial IDM solutions



IDENTITY MANAGEMENT WITH XE

BANNER XE TECHNOLOGY

Extensibility of XE

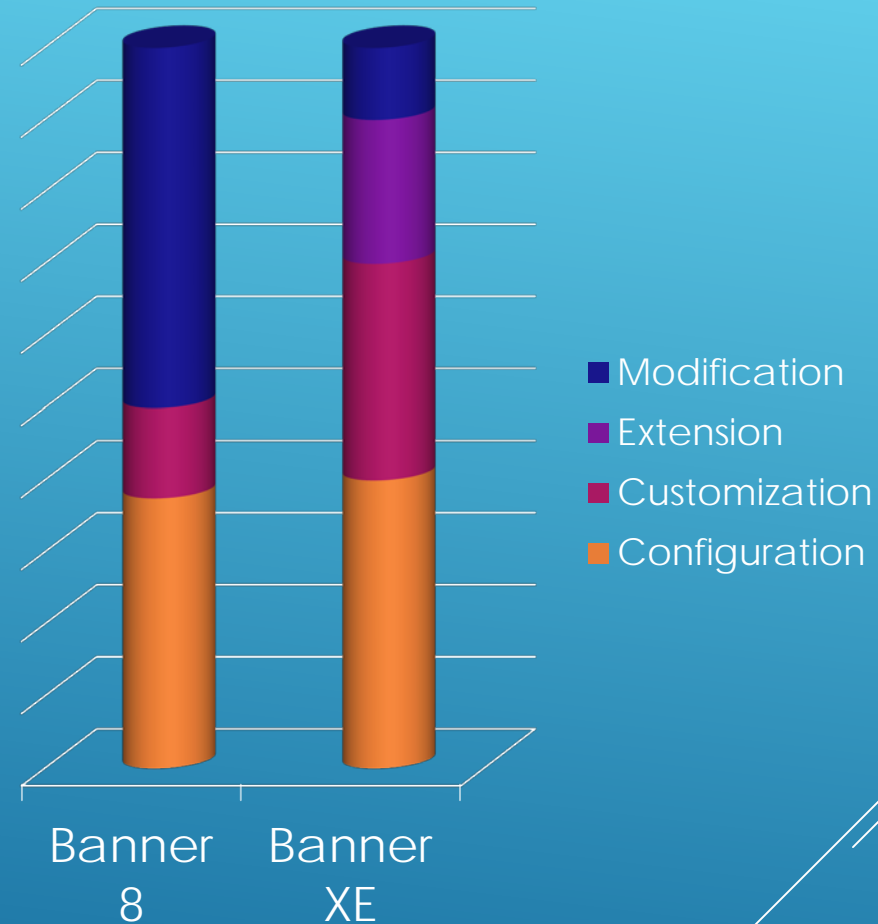
“ability of a software system to allow and accept significant extension of its capabilities, without major rewriting of code or changes in its basic architecture”

▶ Banner 8

- ▶ Lacking in extensibility (91 local mods on the system)
- ▶ modifications required where customization leaves off
- ▶ Were paying \$800K/year to Ellucian for customizations – now supported in house

▶ Banner XE

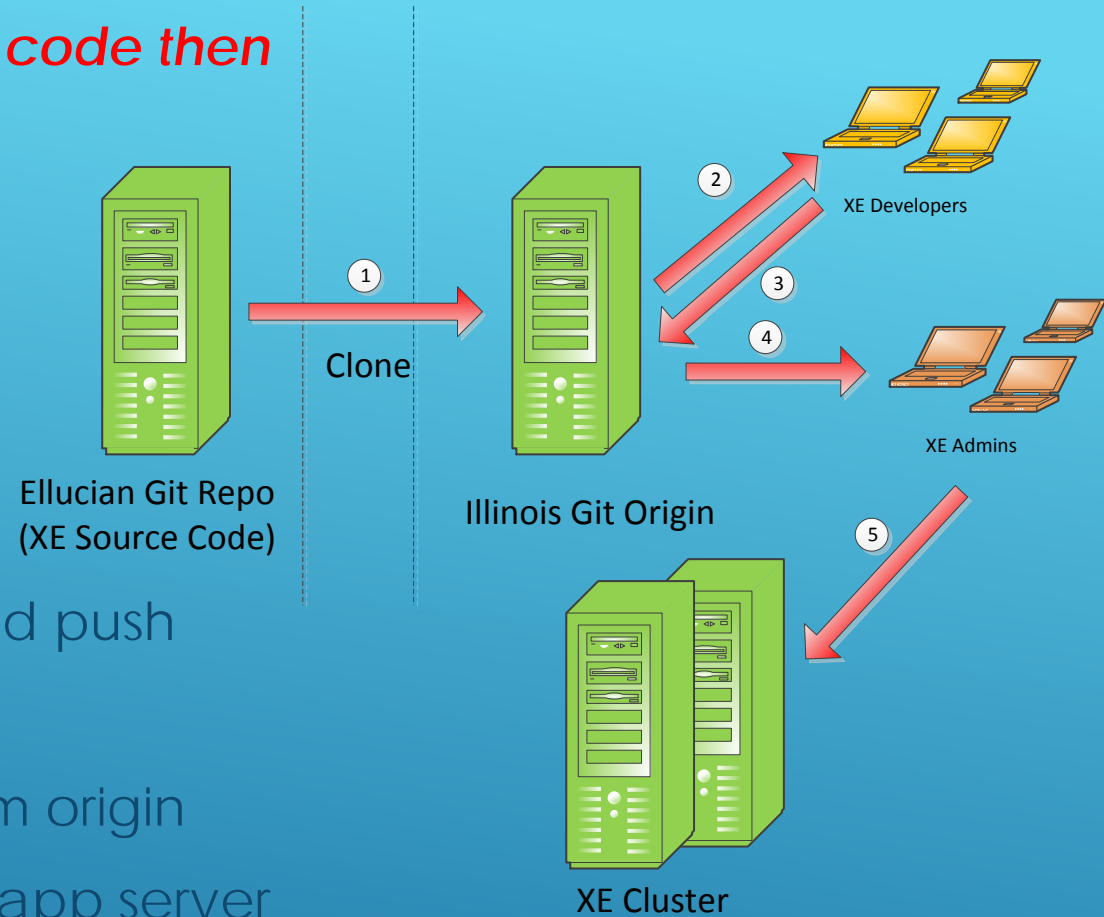
- ▶ provides additional levels of customization
- ▶ adds the ability to extend applications
- ▶ reduces the need to modify applications



GREATER EXTENSIBILITY IN BANNER XE

... If you must modify source code then

- 1- Setup origin git repo and clone from Ellucian
- 2 – checkout to dev workstation with git
- 3 – make changes, test, and push to git origin
- 4 – XE admin checkout from origin
- 5 – build and deploy to XE app server



XE MODIFICATION WORKFLOW

BANNER XE TECHNOLOGY

Application Programming Interface (API)

- ▶ Strategic focus is to expose APIs that adhere to REST (REpresentational state transfer over HTTP) principles whenever possible
- ▶ RESTful APIs exposed as new applications are built and functionality is added
- ▶ Included with baseline functionality alongside Banner modules (i.e when we install registration XE we get the corresponding registration APIs)
- ▶ Previously had to go into database and call PLSQL API or write intermediary application or use/extend existing messaging infrastructure



ELLUCIAN XE STRATEGY



Ellucian XE Registry

Search API Docs



Welcome to the XE Registry! Whether you are new to Ellucian XE or you have attended one of Ellucian's training, conference, or webinar events across the globe, the Ellucian XE Registry is the definitive source for developers learning to master the Ellucian public API's and other extensibility technologies.

Just getting started? Visit the [Developer's Center](#).

If you're ready, then start building today! Ellucian XE is a flexible and open foundation that spans all Ellucian solutions with public, standard, open interfaces. Build new applications, extend existing applications, or both! It's your choice and the Ellucian XE Registry will keep you informed and connected.

Featured API Documentation

RECENTLY RELEASED API's

[Mobile Integration Server API](#)

[Mobile Cloud Application API](#)

[Banner Registration APIs - Controlled release](#)

OTHER AVAILABLE API's

- [Banner eTranscript API](#)
- [Banner/Recruiter Integration API](#)
- [Intelligent Learning Platform \(ILP\) API](#)
- [Ellucian Degree Works API](#)
- [Colleague Web API](#)
- [Banner Advising and Term APIs](#)

- Catalog of API (REST calls)
- Updated/expanded with releases

XE API REGISTRY

Banner Student Registration Web Services Technical Guide

Author: Banner XE API Team
Date: 2014-05-05
Version: 9.0
Copyright: 2014 Ellucian Company L.P. and its affiliates

Contents:

- Overview
 - Security
 - Banner Registration Model
- Registration Open Terms
 - GET
 - Request
 - Response
 - Examples
 - No filter
 - Term code filter
 - Term code "starts with" filter
 - Term description filter
 - Term code and description filters
 - Term code, description and search description filters
 - Term code order by filter
 - Term code filter with pagination
- Register Student to get existing registrations and eligibility for term
 - GET
 - Request
 - Response
 - Examples
 - Eligibility check with re-admission error
 - Not eligible for term
 - Student not eligible
 - Student with holds
 - Alternate pin processing error
 - Access error
 - Study Path errors
 - Time ticket errors
 - Invalid PIN error
 - Registration access error
 - Study path required error
 - Linked course error
 - Eligible student

▶ Fee Assessment for student

Request:

```
POST /api/registration-fee-assessment?bannerId={bannerId}&term={term} HTTP/1.1
```

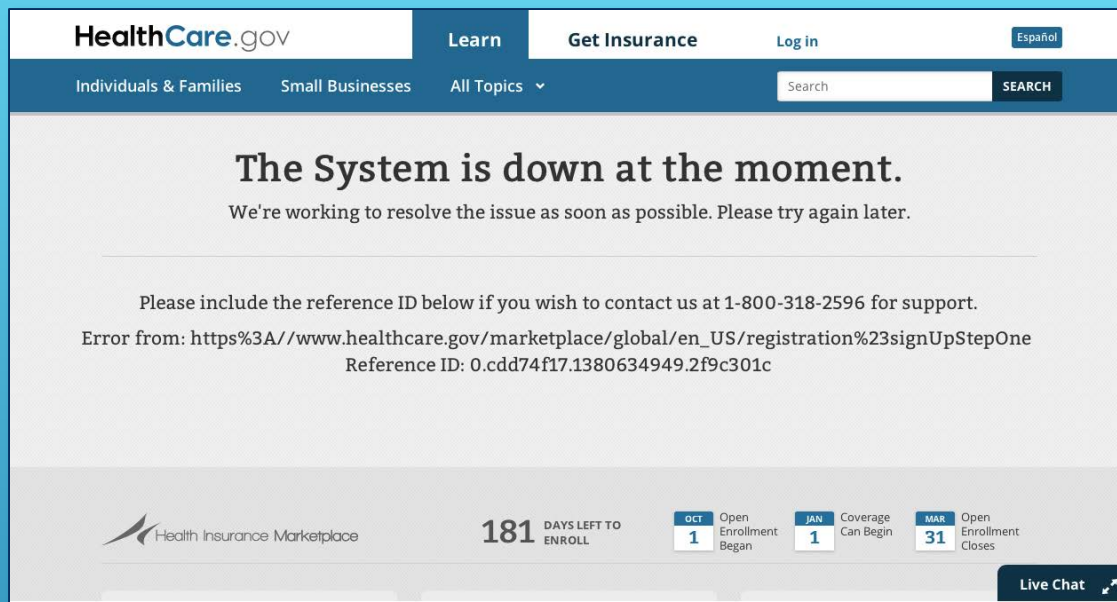
Response:

```
[  
  {  
    "feeAmount": 200,  
    "feeDetailCode": "LAB1",  
    "feeDetailDescription": "Lab Fee"  
  },  
  {  
    "feeAmount": 3500,  
    "feeDetailCode": "THFA",  
    "feeDetailDescription": "Horizon Tuition"  
  }  
]
```

API EXAMPLES

BANNER XE TECHNOLOGY

Performance Testing



The screenshot shows the HealthCare.gov website with a system outage message. The message reads: "The System is down at the moment. We're working to resolve the issue as soon as possible. Please try again later." Below the message, it provides a reference ID and a support phone number. The website header includes navigation links for "Individuals & Families", "Small Businesses", and "All Topics", along with a search bar and a "SEARCH" button. The footer features the Health Insurance Marketplace logo, a countdown timer for "181 DAYS LEFT TO ENROLL", and a "Live Chat" button.

HealthCare.gov

Learn Get Insurance Log in Español

Individuals & Families Small Businesses All Topics Search SEARCH

The System is down at the moment.
We're working to resolve the issue as soon as possible. Please try again later.

Please include the reference ID below if you wish to contact us at 1-800-318-2596 for support.
Error from: https%3A//www.healthcare.gov/marketplace/global/en_US/registration%23signUpStepOne
Reference ID: 0.cdd74f17.1380634949.2f9c301c

Health Insurance Marketplace

181 DAYS LEFT TO ENROLL

OCT 1 Open Enrollment Began

JAN 1 Coverage Can Begin

MAR 31 Open Enrollment Closes

Live Chat



- ▶ Performance/load testing big part of what we do
- ▶ Standard part of the upgrade cycles using Rational Performance Tester
- ▶ Registration Fall/Spring Start of Term heaviest processing from system point of view
- ▶ System has been very stable and performed for a number of years (99.99% availability excluding planned outages FY14)
- ▶ Number of tuning fixes have been implemented over time as a direct result of performance testing

BANNER 8 PERFORMANCE

- ▶ Performance Test XE Registration Controlled Release I (i.e. early adopter release)
- ▶ Goals
 - ▶ Achieve similar/better perf than Banner 8 under peak load
 - ▶ Achieve acceptable perf with advanced searching
- ▶ Test(s) design

Test	Concurrent Users	Total Users	# of Registrations	Notes
Banner 8/XE comp	500	2000	10000	3/4 users register by entering CRN, 1/4 users register by searching
XE advanced searching	500	2000	10000	All users do advanced searching, 2/5 search on simple subject, 3/5 search on (time of day, honors, online, etc..)

XE PERFORMANCE TESTING

- ▶ Initial 20 user test (4 passed/16 failed). Ugh!!
- ▶ ... many iterations, modifications later – Success!!
- ▶ All users passed/registered/didn't bring system to knees
- ▶ Avg timings slower on XE albeit acceptable (XE pages have more content, images, etc.)
- ▶ Much of the processing shifts from DB in 8 to App Server in XE

TEST RESULTS

▶ Architecture – before/after

Application Servers

	Hardware	OS	Software	# App Servers	memory/server	heap size	CPU	# CPU
Before	Dell Blade VM	Linux RHEL 5	OFM 11.1.1.6	2	6GB	4GB	Intel Xeon E5540	2
After	Dell Blade VM	Linux RHEL 5	OFM 11.1.1.6	4	16GB	8GB	Intel Xeon E5540	8

Database Server

	Hardware	OS	Memory	Software
Before	Sun M9000	Solaris 10	96GB	Oracle 11.2.0.2
After	Sun M9000	Solaris 10	96GB	Oracle 11.2.0.4 (with bug fix 17242746)

- ▶ Enable jdbc caching on app server
- ▶ Modifications to Banner source code to reduce SQL traffic
- ▶ Increase jdbc conn pool and initialize connections up front

TUNING ENHANCEMENTS

- ▶ XE requires significantly more middleware/memory than its Banner 8 counterpart. (i.e. Student app essentially broken into 23 modules/apps now)
- ▶ Big learning curve on the new Groovy/Grails architecture. Existing java knowledge eases this transition.
- ▶ Version 1.0 of new application/will need to be patient with vendor during process
- ▶ Have gotten good and efficient at existing processes supporting Banner past 10 years, these will need to be adjusted now

XE LESSONS LEARNED



BANNER XE DEMO – FACULTY GRADE ENTRY



QUESTIONS?



- ▶ Stephanie Dable, AITS, dable@uillinois.edu
- ▶ Beth McCarter, AITS, emason@uillinois.edu
- ▶ Brian Schoudel, AITS, brians@uillinois.edu

THANK YOU!!

A decorative graphic consisting of several parallel white lines of varying lengths, slanted diagonally from the bottom right towards the top right, set against a blue background.